

Description of the male and illustration of the female receptacula of *Yamia watasei* Kishida, 1920

(Arachnida, Araneae, Theraphosidae, Selenocosmiinae)

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Two males and two females of *Yamia watasei* Kishida, 1920 were collected on the island of Lanyu (Taiwan). The male (neotype) is described for the first time and the female receptacula are depicted. After comparison with similar species of the region which lack a tibial spur, the genus *Yamia* is newly defined and its relation is discussed. *Neochilobrachys mutus* and *Baccallbrapo bundokalbo* belong to the genus *Yamia*, as well. As far as no adult males are known, the systematic position of *Phlogiellus baeri* and *Phlogiellus insularis* remains unclear.

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Introduction

The description of a female of *Yamia watasei* by Kishida (1920) was overlooked by Roewer (1942). Brignoli (1983) listed the species, but Raven (1985) referring to Bonnet (1959) and followed by Huber et al. (1996) considered it being a nomen nudum, although Kishida's description exists and it also allowed to find the species at the locus typicus. In the opinion of Song et al. (1999) *Yamia watasei* is a species inquirenda. According to Platnick (2003) it is a nomen dubium. Apparently, in Taiwan itself never any doubt occurred about *Yamia watasei* as it appears in all faunal lists (Chen 1996, Kayashima 1943, Li 1964, Zhu & Okuma 1975).

One of the authors (J.H.) raised two males of this species from juveniles collected at the locus typicus in Lanyu, Taiwan in 2000. Because the female type of this species deposited in the Museum of the Zoological Institute, College of Science, Imperial University of Tokyo, was destroyed during the second world war, the designation of a neotype and a description of the species under contemporary taxonomic aspects was necessary.

Generally, the smaller and unobscured Theraphosids are fairly unknown. The reason may be rather simple, in the face of impressive large theraphosid spiders nobody pays much interest to the small ones. In this situation, we hope to add some clarification instead of increasing the mess and we suggest that different from the past practice, no single female in this group should be described as a new species without having the appropriate male, as well.

Material and methods

Investigations were carried out with a Wild M3 stereoscopic microscope equipped with a drawing prism and a magnification lens (Novoflex) allowing magnifications up to 80×. Besides two males and two females of *Yamia watasei* collected in Lanyu (portuguese name Botel Tobago, japanese name Kōtōsho) (Taiwan) the following type material was studied for comparison: *Phlogiellus baeri* (Simon, 1877) (adult female during moulting) and *Phlogiellus insularis* (Simon, 1877) (juvenile male?, juvenile), *Neochilobrachys mutus* Giltay, 1935 (adult female, sub-adult female) and *Chilobrachys samarae* Giltay, 1935, as

well as *Ischnocolus inermis* Ausserer, 1871.

Receptacula, tarsal claws of leg I and IV, the eye tubercle, the palpal organ, spines on the metatarsus as well as scopulae of tarsi and metatarsi were studied.

Reference specimens are deposited in the collections of Zoologische Staatssammlung München (ZSM) (1♂, neotype), 1♀ paratype) and in the Museum of Natural History in Taichung (Taiwan) (NHTG) (1♂ paratype, 1♀ paratype).

Diagnosis of the genus *Yamia*

Small theraphosid spider lacking stridulation bristles. A tibial spur is absent. A third claw present at tarsus IV. Denticles (cuspules) present on 'labium' and ventral side of pedipalpal basipods. The eye tubercle is situated close to the anterior margin of the prosomal shield ('carapace') which means that a 'clypeus' is only narrow or even absent. Anterior eyes in almost straight row or slightly procurved. The palpal organ, although bulbous in its middle part, is characterized by a distinct keel running from the bulb along the embolus.

Yamia watasei Kishida, 1920 (Japanese name: Watasegumo)

Figs 1-7

Yamia watasei: Kayashima (1943).

Yamia watasei: Li (1964).

Yamia watasei: Zhu & Okuma (1975).

Yamia watasei: Chen (1996).

Types. Neotype: ♂, Yongchin farm, Yeyin village, Lanyu island, Taiwan, 2000-VIII-07, J. Haupt leg. (ZSM).

Additional material from neotype locality: 1♀ (ZSM), 1♂, 1♀ (MNHT), Yongchin farm, Yeyin village, Lanyu island, Taiwan, 2000-VIII-07, J. Haupt leg.

Diagnosis: Male with twisted keel along embolus, undivided scopulae on metatarsi and tarsi of legs I-III, scopulae on metatarsi and tarsi of leg IV divided by numerous long bristles. Female with divided scopulae on all legs. Tarsal trichobothrial shafts partly bulbous, while trichobothrial shafts on metatarsus and tibia are long and thin. Receptacula broad at base with simple rounding apically.

Description

Male neotype. Measurements. Total length 12.7 mm, dorsal prosomal shield 6.5×5.2 mm. Length (mm) of palpal and leg articles:

	femur	patella	tibia	meta-tarsus	tarsus	total
palp	3.3	1.7	2.6	—	1.3	9.0
leg I	5.2	3.1	4.2	3.6	2.9	19.0
leg II	4.8	2.7	3.5	3.3	2.6	17.0
leg III	3.9	2.3	2.5	3.5	2.3	14.5
leg IV	5.5	2.6	4.6	4.9	2.6	20.2

Eye tubercle (Fig. 1) 0.53×0.61 mm. Diameters of the eyes and their separation (mm): AME 0.25, AME-AME 0.14, ALE 0.33, AME-ALE 0.05, PME 0.22, PME-PME 0.53, AME-PME 0.11, PLE 0.28, PME-PL 0.04, ALE-PL 0.11.

Colour. Totally greyish brown, except for dark pigment around eyes.

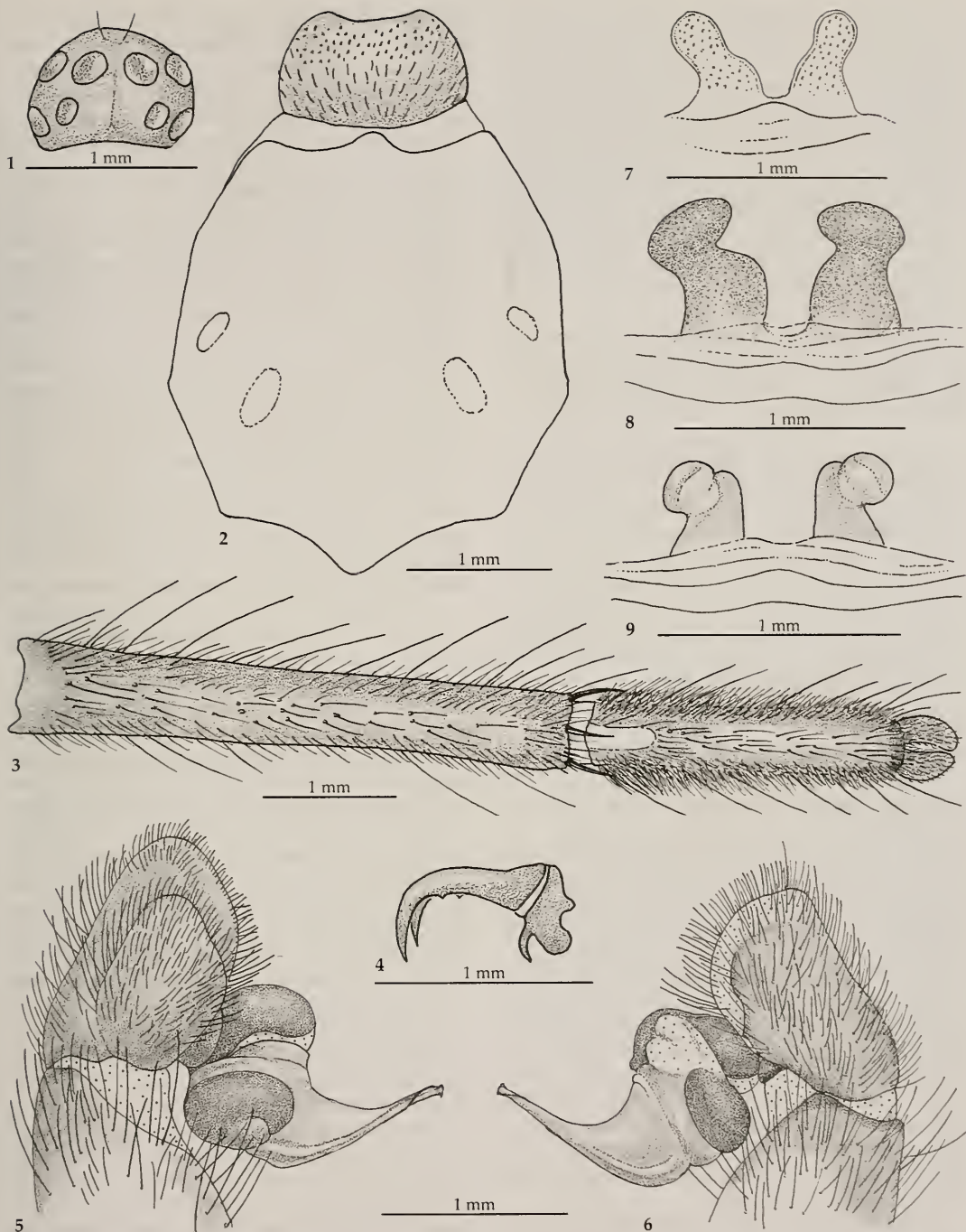
Dorsal prosomal shield ('carapace'). Cephalic area higher than thoracic area, fovea almost straight, slightly procurved, distinct space between eye tubercle and anterior margin of dorsal prosomal shield, first row of eyes almost straight, second row slightly recurved. Ventral prosomal plate ('sternum') (Fig. 2), widest between basipods II and III, sparsely clothed with short hairs. Two pairs of sigilla, the first pair opposite basipods II, marginal, the second pair opposite basipods III, more remote from the margin than its lower diameter. 'Labium' wider than long, numerous denticles (cuspules) occupying more than apical third of it, denticles also on the medioventral side of the pedipalpal basipods ('maxillae'). Chelicerae, as well as prolateral side of pedipalpal basipods lacking stridulatory organ. Promargin of chelicerae with 9 teeth.

Legs. Formula IV, I, II, III. Tarsal trichobothrial shafts partly bulbiform, those of metatarsi and tibiae all setiform. No tibial spur present. Scopulae: All tarsi and metatarsi fully scopulated, scopulae of metatarsi and tarsi of leg IV divided by long bristles (Fig. 3). Tarsi of all legs with two claws, these with 0-2 median teeth, third claw on tarsus IV rather small (Fig. 4). Spination: Metatarsus III with two dorsolateral subterminal spines, metatarsus IV with one retrolateral, subterminal spine.

Palpal organ. Bulb almost globular, without distinct hook, embolus curved, with distinct longitudinal keel twisted around the embolus (Figs 5, 6).

Opisthosoma 6.1 mm long, 3.6 mm wide. Posterior spinnerets: proximal article 1.05, middle article 0.7, distal article 1.4, total length 3.15. Colour greyish brown.

Female from neotype locality. Same as male, receptacula (Fig. 7) one pair, bulbous, basally thickened. Scopulae on ventral side of pedipalpal tarsi, tarsi and metatarsi of legs I-IV all divided by rows of long setae.



Figs 1-7. *Yamia watasei*. 1. Eye tubercle of male neotype. 2. 'Labium' and ventral prosomal plate ('sternum'). 3. Left fourth leg, ventral view with divided scopulae on tarsus and metatarsus. 4. Claws of 4th leg. 5-6. Left palpal organ in proteral (5) and retrolateral (6) view. Note the divided tarsus and the twisted keel around the embolus. 7. Receptacula in dorsal aspect.

Fig. 8. Receptacula of *Yamia muta*.

Fig. 9. Receptacula of *Phlogiellus baeri*.

Distinction to *Yamia muta* by shape of the receptacula (Figs 7, 8). Anterior eyes of this species slightly procurved, posterior eyes almost straight, fovea slightly procurved, numerous denticles (cuspules) on 'labium' and pedipalpal basipods present, posterior pair of sigilla remote from margin, basal article of chelicerae with 10/9 teeth, respectively, stridulation organ lacking, tarsal scopulae I-II not divided, tarsal scopulae III divided by two rows of bristles, metatarsus lacking scopula, scopulae of tarsus and metatarsus IV divided by several rows of setae. Unfortunately, the male of this species is still unknown.

Distinction to *Yamia bundokalbo* by shape of palpal organ, which has a large keel on the bulb and by the shape of the receptacula which are not thickened basally (Barrion & Litsinger 1995: fig. 5q).

Natural history. *Yamia watasei* is locally rather abundant, apparently living stenoecous in shadowy forests which are close to natural conditions. It prefers to build the entrance to its subterranean system of silk tubes under stones, apparently in order to avoid direct access of rain water. The soil must be moist. Prey consists mostly of insects seeking shelter under stones. After catching such prey which touched the silken mouth of a tube's entrance, the spider returns back into the tube system.

Discussion

When Kishida (1920) described *Yamia watasei*, he had considerable difficulties where to place it, and finally he created a new tribus Yamiæae which would be a subfamily Yamiinae today. The reason for such taxonomic difficulties still exists, because the way of classifying is still the same (Simon 1892, Gravely 1915). The subfamilies Ischnocolinae and Selenocosmiinae are distinguished by characters like keeled embolus not present in Ischnocolinae (exception: *Plesiophrictus* according to Smith 1990) and the position of sigilla (more distant from the margin of the 'sternum' in Selenocosmiinae). A conspicuous character is the presence of a stridulatory organ, the existence of which in Theraphosids was first described by Pocock (1895). It divides several subfamilies, like the Selenocosmiinae, Theraphosinae, Harpactirinae, Aviculariinae.

Certain characters do not seem to be very useful for classification: Simon (1892, followed by Raven 1985) used the division of tarsal and metatarsal scopulae to distinguish different genera. Males and females of the same species could end up in different groups because their scopulae show considerable differences (Barrion & Litsinger 1995 and present

species). Pocock (1897) already stated that 'the classification of scopulae is purely artificial and valueless', even though Smith (1990) again used this character as one of several to distinguish different genera.

Thus we are left with the morphology of sexual organs. In many cases the palpal organ may offer more characters than the theraphosid receptacula, but not in all cases the male has been described. As a distinguishing character between Ischnocolinae and Selenocosmiinae we preliminarily propose the more or less deep division of the male pedipalpal tarsus, and the absence or presence of a keel on the palpal organ.

In this place we do not want to enter a wider discussion, because only newly collected material of both sexes and possibly the help of molecular biology may elucidate problems of classification and cladistics in this group of spiders.

In the classical way the genus *Yamia* has to be placed in the Selenocosmiinae without stridulation organs, a group distinguished by Gravely (1915) and Schmidt (1999). When Giltay (1935) described his new species *Neochilobrachys mutus*, he stated that '... se distingue des autres espèces du genre *Neochilobrachys* par la réduction extrême de l'organe stridulatoire.' But when studying the type material, it becomes obvious that the so-called stridulation organ which Giltay stated to be 'réduit à 1 seul bâtonnet', consists of nothing but one normal, relatively small seta which although a little bit longer than the few setae in the neighbourhood lacks all special differentiations of setae for a stridulatory organ. This means *Neochilobrachys mutus* lacks a stridulatory organ and was certainly misplaced in this genus. Herewith we transfer this species to the genus *Yamia*. The genus *Braccallbrapo* established on the occasion of the description of *B. bundokalbo* readily fits to *Yamia*. Therefore it is considered a junior synonym of this genus. It had been considered being a synonym of *Phlogiellus* by Raven (2000).

The types of *Phlogiellus baeri* and *Phlogiellus insularis* were considered to belong to this genus by Simon (1897, p. 955) within the Selenocosmiinae. Characters of both species are summarized here:

Phlogiellus baeri: Eye tubercle close to anterior margin of dorsal prosomal plate, anterior eyes procurved, posterior eyes recurved, ALE very large, fovea deep, slightly procurved, numerous denticles (cuspules) on the 'labium' and the pedipalpal basipods, receptacula bipartite (Fig. 9), posterior pair of sigillae remote from margin, basal articles of both chelicerae with 10 teeth, no stridulatory organ, tarsal and metatarsal scopulae I divided by small setae, II: tarsal scopulae divided by several rows of setae, metatarsal scopulae divided by a few irregular, small

setae, III and IV: tarsal scopulae divided by several rows of setae, in metatarsi setae irregular, posterior article of lateral spinnerets rather long.

Phlogiellus insularis: Eye tubercle close to anterior margin of dorsal prosomal plate, anterior eyes weakly procurved, AME very large, almost touching each other, posterior eyes recurved, fovea distinctly procurved, numerous denticles (cuspules) on 'labium' and pedipalpal basipods, posterior pair of sigillae remote from margin, basal articles of chelicerae (both sides) with 9 teeth, stridulatory organ lacking, tarsal scopulae I undivided, II divided by 2 rows of setae and several additional setae, III and IV divided by several rows of setae, metatarsal scopulae IV only divided in distal part. No receptacula were found in the big specimen, the small one ('male') is a rather young juvenile. Although both species belong to the Selenocosmiinae, we consider them as incertae sedis, as the males are unknown.

Phlogiellus inermis could not be studied in detail: the left palpal organ may have been lost when the specimen was still alive, as the pedipalpal basipod is distally dark brown, while the right palpal organ had been cut off, lateron. Unfortunately it was lacking. But the palpal organ of this species is illustrated by Simon (1903, p. 953).

Zoogeographic considerations

The island of Lanyu is of volcanic origin dating back to Miocene-Pliocene volcanism (Pelletier & Stephan 1986) and it forms part of a volcanic arc which also includes the Batan Islands. Therefore, all species living there must have reached the island since that time or they were introduced by man. Some species are not likely to travel over the sea, although the prevailing sea current is in northern direction. While the whipscorpion *Typopeltis crucifer* e.g. occurs in Taiwan itself and in Lanyu (Haupt & Song 1996, Haupt 1997), *Yamia watasei* is limited to Lanyu and has never been found in Taiwan itself.

Since the early thirties of last century it is known that the indigenous Yami population obviously moved north to Lanyu, and there are still close linguistic connections to the Batan Islands in the northern Philippines (Utsurikawa 1931, West 1995). Therefore, it seems likely that *Yamia watasei* has been introduced to Lanyu from the Philippines by Yami people together with roots to be planted. Many biotopes in Lanyu have undergone considerable change during the past 60 years, therefore, it is unlikely to find out whether *Yamia watasei* has ever been more wide spread in this island.

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